MISCELLANEOUS REPORT NO. 31

THE CHANGING FORESTS OF THE LAKE AND CENTRAL STATES REGION

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Somewhat more than 100 years ago an eastern emigrant, tired and weary from his travels across Ohio, Michigan, Indiana, and Illinois, arrived in Milwaukee. In broken French and with a bewildered look he asked a stranger, "What will I find if I continue north from here?" "Nothing but woods, to the world's end," was the reply. "And what in this direction?"--pointing inland. "Prairie and the last great river."4/ With such a brief generalization one might stop and leave the rest to the imagination. Now, 100 years later, through the efforts of countless foresters and others, one can be more descriptive.

To most of us here in this vast midcontinent region it is evident that the forest resource is changing rapidly. The old adage that change is the only constant seems well sustained.

Before considering the various aspects of our changing forests it may be well to place the region in full perspective. Nine midwestern states constitute the Lake and Central States area.5/ They extend westward from Ohio to the Great Plains, and north from the Ohio River to Canada. Within these states are one-sixth of the forest area and one-third of the people of the United States, and large concentrations of industry and agriculture. Consumption of forest products is roughly four times production, and yet sizable exports of veneer, lumber, and paper products go out to other regions.

1/ Paper presented at the Annual Meeting of the Society of American Foresters in Milwaukee, Wisconsin, on October 25, 1954.

2/ Acknowledgment is gratefully made for the assistance of staff members in the Division of Forest Economics, Lake States Forest Experiment Station, in assembling much of the data used in this paper.

3/ Maintained by the U. S. Department of Agriculture, Forest Service, in cooperation with the University of Minnesota, St. Paul Campus, St. Paul 1, Minnesota.

4/ Upper Mississippi, A Wilderness Saga, by Walter Havighurst, pp. 9-10. 1937.

5/ Kentucky, a "border" state served by the Central States Forest Experiment Station, is not considered in this discussion.

Primarily, our's is a region of small forest industries and of small forest holdings. It is a region characterized by farm woodlots, by small-scale woods operations, and by small sawmills and numerous secondary manufacturing plants. There are exceptions, of course, particularly the pulp and paper industry which includes more than 50 mills with large and expanding production facilities. A few sizable lumber operations remain--several on a sustained-yield basis. The small forest holdings, which account for over three-fourths of the private lands, average about 50 acres per holding. Large holdings--those over 100,000 acres--are less than 15 in number.

As for forest types and tree species, we have about everything and anything found in the East. At the southern extremity down along the Ohio River the oaks and bottom-land hardwoods predominate. Northward lies a rich and extensive agricultural area with intermingled stands of mixed oak and other hardwoods. Further north one encounters an extensive aspen type covering about one-third of the Lake States region. Also in the North are extensive areas of conifers and northern hardwoods. Mixtures of many species are not uncommon; pure coniferous types, so typical of other forest regions, are the exception.

TRENDS IN THE LAKE STATES

With this brief descriptive background, what are the more important recent trends? As a result of the continuing Forest Survey project, there is much information about the timber resource and what is happening to it in the Lake States. An initial forest survey was made in the thirties, and a resurvey started some 15 years later is well along. With such material as background and from other studies it is possible to give a fairly good summary of some of the major changes in recent years.

Since the days when Paul Bunyan swept across the northern Lake States performing heroic feats, and the great fires at Peshtigo, Hinckley, and Cloquet wiped out most of the pine forests, things have been happening. First and most important, forest fires have been reduced in size, frequency, and severity; second, a large public effort has gone into the acquisition and development of public forests; and third, there has been a surge of interest in and practice of forestry by many private forest-land owners. It is largely the result of these three developments that the forests in the Lake States show signs of increasing productivity.

One of the most noticeable trends is the thickening up of forest stands. The second-growth forests, although slow to get started, are advancing rapidly to merchantable sizes. In less

than 20 years the growing stock in one group of counties has increased 16 percent. The recently completed reinventory in Minnesota shows that the sawtimber volume of all species is approximately the same, while in Upper Michigan, where cutting of virgin hardwoods has progressed rapidly, there is no doubt that the sawlog volume has declined. It is interesting to note, too, that the timber volume per acre is much greater on those lands which have been under management the longest.

Although the cubic-foot volume appears to be increasing somewhat, there is not much evidence of reduction in the deforested area, or of conversion to types and species of greater value. Not so long ago, there were more than 11 million acres of deforested timberland and 13 million acres of very poorly stocked young growth. Recent county and State surveys indicate that the poorly stocked acreage has been reduced almost by two-thirds, but relatively little reduction has been made in the deforested area. Some of this land is intrinsically poor for forestry, being swampy, rocky, or exposed to climatic extremes. However, some areas would produce good timber if restocked and protected from grazing and other damaging agents.

Reforestation

In the field of reforestation the Lake States has an outstanding record. Some of the earliest tree planting was done here, and already these plantings are entering significantly into the land-use pattern and the timber supply More than 75 years ago, the first Lake States plantation was established here in Wisconsin. In the intervening period close to 2 million acres of trees, mostly pines, have been planted, and as of now over 25 percent of all planting in the United States has been here in the Lake States. Michigan alone has planted over 1 million acres, more than any other state in the country.

Starting in the thirties, planting has increased sharply and in 1936 reached a peak of 144,000 acres. For a few years planting continued to exceed 100,000 acres, but thereafter declined and almost ceased during World War II. Since then, planting programs have again moved forward rapidly and last year exceeded 80,000 acres. There is every indication that the rapid post-war increase will continue.

As the acreage of plantations has increased, the planting program has shifted to meet the needs for such work. Twenty years ago, about 70 percent of all planting in the Lake States was on Federal lands, 20 percent on State and county lands, and 10 percent on private lands. As a result of this early effort, the need for planting has lessened on public lands. In the past eight years, greatest emphasis has been on planting private,

county, and State lands, where there is the greatest acreage in need of planting. Last year, 65 percent of the total planting effort was on private lands; an almost complete reversal of what was taking place 20 years ago.

For the past accomplishments and the present planting program there is every reason to be proud. But even so, there is still a big job ahead. With nearly 10 million acres of deforested lands, much of which has a dense brush cover, the remaining job will be increasingly difficult and costly. Then, too, with the problem of getting adequate natural restocking following cutting there will continue to be a sizable area which must be planted. All in all, it looks like planting must continue to be a major forestry activity in the Lake States.

Forest Composition

One of the most interesting subjects for discussion is what is happening to forest types and species composition. In the Lake States there are four major forest types: aspen, northern hardwoods, spruce-fir, and oak.

The Aspen Situation

Aspen, by far the most extensive type, covers over one-third of the total forest area and dominates the timber supply picture. For some years there has been much speculation as to what is happening to the aspen type and what may be its future. The recent Forest Survey Report for Minnesota shows a 50-percent increase in the volume of aspen pulpwood, and a similar trend is indicated in other areas.

It has been obvious for some years that conversion from aspen to other types is in progress. Less obvious is the fact that aspen is invading other types. One study showed about 2 million acres of aspen converting to northern hardwoods and nearly 1.5 million acres going into fir and spruce. Only one-half of the total aspen area showed no tendency to convert to other species. On the other hand, when other types such as pine and fir are cut, there are indications that aspen invades. Aspen also is coming in on abandoned farmland. Yet, over a period of years the total acreage of aspen has not changed much, although perhaps we are not always talking about the same acres. Generally, it looks now as though aspen is pretty well holding its own in area and is increasing in volume. For at least another 20 years, aspen will undoubtedly continue to be one of the most important trees in the timber economy of the Lake States.

Northern Hardwoods

The second major type, northern hardwoods, covers one-sixth of the forest area. The last of the old-growth hardwood is now being cut and second growth shows many signs of aggressiveness. Pole stands predominate in volume and restocking stands in area. Stand composition summaries indicate that while sugar maple is holding its own, yellow birch is falling off and basswood and elm are increasing. Hemlock, long an important component of the northern-hardwood type, appears to be going out. There are some indications that the area of the hardwood type is increasing.

Conifers

The failure of conifers to reproduce adequately and their continued shortage has caused considerable concern. In Minnesota and in those parts of Michigan where the reinventory has been completed, the indications are that the area of softwood types is decreasing, in spite of planting, improved fire protection, and other forestry activities.

The past 15 years has seen a continued shrinking in area of old-growth pine and few areas of natural second growth or of plantations have reached sufficient size to produce the type of lumber for which the Lake States was once famous. Jack pine plantations, on the other hand, are beginning to reach pulpwood size and plantations on some of the public lands will soon be contributing substantial yields of new wood. The spruce swamp type is not changing much in area, but under pressure of heavy cutting the tendency is towards a decline in growing stock and growing capacity. Exceptions can be noted on some of the industrial forests and on some public lands. Tamarack and cedar swamps, cut rather lightly in recent years, are building up their growing stock and yield capacity.

About all that can be said now is that without a continuing planting program and greater efforts to secure natural reproduction there is no room for optimism about an appreciable improvement in the supply of conifers.

Oak

For the fourth major type, oak, it appears that more is in the offing. There is evidence of sizable area and volume increases in some sections. In Lower Michigan where current surveys are near completion, the acreage of oak type has increased nearly 30 percent during the past 17 years through natural seeding on deforested land and invading abandoned farmland and pastures. Moreover, in the same area the sawtimber stands of oak which made up less than one-third of the type in 1936 now make up

one-half. As a result, the sawlog volume of oak in Michigan has increased about 70 percent. The evidence is that the oak type is becoming more and more prominent and may supply an ever-increasing part of both the pulp and lumber needs of the region.

Ownership Situation

Another subject of importance in the forestry picture of the Lake States is ownership.

The period of the early 1930's was one of great instability in forest-land ownership. Private land owners generally were pessimistic as to profitableness of holding timber lands and were selling large acreages to the Federal Government at low valuations and were forfeiting control of additional large areas by non-payment of taxes. States and counties were taking title to tax-forfeited lands by the millions of acres but had only the haziest ideas of what to do with it. Additional national-forest units were established and boundaries of existing units were extended. In some cases, Federal, State and county forests overlapped.

During the intervening 20 years, the ownership situation has stabilized greatly. Public agencies have reached agreement in the main as to spheres of responsibility and public forests have become stabilized on a more or less definite pattern. The Federal Government, States, and counties each are making rapid progress in preparing management plans and cutting budgets for the properties under their jurisdiction. Gradual progress is being made in effecting land exchanges in overlap districts in the interest of more economical and efficient management.

Perhaps the most striking change in the situation is on private land. Whereas in the thirties the private owner's primary aim was to salvage what he could from his land and then under the stress of economic pressure to dispose of it to a public agency, today many private companies are in the process of acquiring forest land and building up sustained-yield properties. This change has come about through a combination of improved economic conditions, better fire protection and resulting greater timber growth, and a growing realization upon the part of the industries and the general public that to maintain permanent and profitable industries requires attention to forest management.

Today, about 40 percent of the commercial forest land in the Lake States is in public ownership (14 percent Federal, 15 percent State, 11 percent county and municipal). About 29 percent is in farms; 31 percent in industrial and other hands. Some tax forfeiture still occurs but is largely offset by sale of scattered public lands to farmers and other private owners.

The Quality Problem

Timber quality is another subject worthy of attention. The rapid growth of the pulpwood market has lessened interest in high-grade sawlogs, but even so the lumber and veneer industries are significant parts of the forest economy, and from all indications will continue as such for some years. What is happening to quality is difficult to appraise, but from various surveys and special studies there are some guides. From the general thickening up of stands we can infer improvement in tree form. On the other hand, the average tree size is decreasing. In sugar maple, for example, the present volume of trees 18 inches and larger is 44 percent, whereas 17 years ago it was 61 percent.

The average quality of hardwoods, as shown by log-grade studies, is poorer than before. One study in Upper Michigan showed that number three grade logs made up about one-fourth of the log volume in the thirties and one-half of the volume more recently. In other sections and in some species this situation is probably not as pronounced, but the evidence is strong that the sawlog quality is down.

Another expression of quality is species composition of stands. Here we find disturbing factors, especially in hardwoods. Local surveys indicate an appreciable drop in yellow birch sawlog volume and increases in the less desirable species, such as elm, red maple, and aspen.

Further evidence of the quality problem is found in the short supply of veneer logs, the shortage of long-fibered coniferous pulpwood, and the procurement problems in such products as poles and piling. With the increasing attention in forest management to stand composition, reduction of logging damage, and selection cutting of hardwoods, the quality trend may reverse itself in the years to come.

Accessibility

A few words about accessibility and then the picture of major trends in the Lake States will be complete. Like other regions, there are many stands which are now accessible but which 30 years ago were inoperable because of their remoteness. As logging methods evolved from water transport to railroads and then to trucks, accessibility of stands has become less of a problem. Some of our pulpwood still moves by water, mainly on the Great Lakes; some of our sawlogs, mainly hardwoods, move by rail, as does most of the pulpwood. But the key to accessibility and close utilization is the well-developed road system for truck hauling.

What is lacking most are all-season roads. Because of extensive areas of poor drainage, logging tends to be highly seasonal. But progress is being made in extending the transport system and if present price levels and rising demands continue, coupled with the trend toward smaller logging operations, the factor of accessibility will soon disappear.

TRENDS IN THE CENTRAL STATES

Turning to the Central States area, it is much more difficult to pin point trends. An initial inventory of the timber resource on a uniform regionwide basis is just about complete. Earlier regional estimates were sketchy and are not particularly helpful in evaluating trends, but from the recently published State reports for the Forest Survey project, certain broad patterns of regional importance are emerging.

Three major forest divisions characterize the region: the cornbelt or glaciated area, the rough uplands in the South, and the Ozark uplift in southern Illinois and Missouri. Intermingled with all three divisions are the bottom lands along the river flood plains with their distinctive species associations.

Originally the Central States area had over 100 million acres of forest land. Largely through clearing for agriculture and settlement, the original forest area was reduced about two-thirds. In recent years, the evidence is strong that through planting and invasion of pasture land the forest area may be increasing.

Unlike the Lake States, the Central States did not experience a major shift in forest ownership during the depression years. The small farm woodlot predominates. Public acquisition was on a smaller scale, except in the Ozarks, and was confined mostly to abandoned hill farms. At the present time, all public holdings amount to less than 8 percent of the total forest area and appear to be stabilized. Forest industries own only a very small percentage of the forest land. Most important are the large holdings of coal, gas, and oil companies.

Reforestation is one of the more popular forestry activities. In the past 20 years over 300,000 acres of trees have been planted, and in the past 4 years the area planted has more than doubled. More than 60 percent of the planting is on private land, and prominent among the industrial group are the coal companies planting on strip mined land.

Fire and Grazing

Fire losses have been prominent in recent years, especially in the Ozark area. Organized protection against fire now covers most of the hill country, but even so, fire control is not adequate to cope with prolonged droughts. In the Ozark forests, for example, there has been a continuous "fire season" for more than 3 years. The result has been that over 1 million acres have burned annually--more than 10 times the area burned in the Lake States. In spite of tinder-dry conditions in a thickly populated area where woods burning is traditional, fire-control organizations have done a good job.

In the farm-woodlot area grazing continues to be a problem. For example, in Indiana the Forest Survey found over 400,000 acres so heavily grazed that it is doubtful if the forest will survive. What is happening in such areas is to convert established forests to open grassland.

Timber Volume and Quality

Considering only the timber supply, we find evidence of two interesting trends in the Central States. Almost every survey points to increases in timber volume. As each State survey report has come out, the story has been one of an excess growth over drain for both the total cubic- and board-foot volume. This has been especially true for poletimber and small sawtimber sizes.

But as the volume increases, there are signs of a growing quality problem, much as we have in the Lake States. The tendency in the Central States, and certainly an understandable one, is to take out the merchantable sawlog material and leave the culls. Recent reports show the annual cut of sawlog material averages around 40 percent of the volume in grades 1 and 2 logs while the inventory shows only 15 percent of the volume in the same grades. In Missouri the timber inventory showed that the volume of cull trees is about one-third of the gross board-foot volume in all sawtimber trees. For the region as a whole, it is estimated that one out of every four trees of sawtimber size is cull. Disturbing, too, are the factors tending to favor the less desirable species. Grazing, for example, favors the unpalatable species, mainly hickory which has very few markets. Where the forest is invading old fields such species as sassafras, persimmon, and other undesirables are forming the forest cover.

Both the quality and species composition problems give emphasis to the big job ahead in the Central States. Already there are signs that the situation is improving somewhat. The over-all

favorable growth-drain balance which characterizes the region should eventually have an effect on the quality balance, too. Trees now in the smaller diameter sizes, given adequate protection, will be the high-quality sawlog material of tomorrow. In Indiana, for example, it is estimated that 20 years will be required to balance the quality growth and cut statewide. Emphasis by public and private educational groups on stand-improvement measures is helping. Even greater progress can be made, especially in getting low-quality growing stock out of present stands, by seeking improved harvesting, utilization, and marketing.

SUMMARY

To summarize briefly: Many changes are taking place in the forests of this vast midcontinent region; some are strengthening the forest economy, others should be of concern. In the Lake States, the most significant points are the thickening up of forest stands in recent years, the presence of a sizable area of deforested land, the expanding reforestation program, and the stabilized ownership situation. Also of interest are the favorable outlook for aspen in the next two decades, the concern about maintaining conifers, and the expanding supply of oak. Improvement of timber quality is an important need.

In the Central States we find, as we did in the Lake States, increases in timber volume and area planted. Of special concern is fire in the Ozarks, regionwide grazing, and the high percentage of low-quality hardwoods. These are all problems to watch, think about, and act on. Present programs are positive forces tending to shape the future and give reason for optimism.